Apparatus for Supporting Elongate Sticks

The present invention is directed towards apparatus for forming the basis of a system for testing human dexterity and forming the basis of a recreational game, and more particularly to an apparatus for supporting elongate sticks which may be balanced thereon so as to maintain stability of such apparatus.

Human dexterity may be challenged and tested in a variety of different manners but it is commonly recognised that the human body can be conditioned so as to exhibit more control and dexterity through appropriate training and recreational techniques. Examples of apparatus which can prove useful in developing dexterity as either a specific training function or as a recreational pastime include such games as that referred to commonly as "pick-up sticks" whereby a plurality of thin elongate wooden or plastic rods or sticks are randomly dropped on a surface to form an appropriate heap whereby users subsequently attempt to remove, in a consecutive order the sticks without disturbing others in the pile. This particular game requires a high degree of dexterity and steadiness of hand and its repeated use can serve not only as a recreational pastime but also as a method of testing human dexterity and ultimately a method of training the human body for improved dexterity and physical stability. Similar games and pastimes of this type include the game currently marketed under the Trade Mark "Jenga" which involves the formation of a stack of wooden blocks necessitating removal and continued stacking of such blocks from the original stack until the tower

created thereby collapses. Whilst this game again requires a steadiness of hand and is considered a measure of dexterity, it is limited in application in that the wooden blocks, when being restacked, can only be positioned in one of three orientations thus limiting the creativity of the user and the challenge presented thereto.

Primarily these prior art systems involve removal of articles which, whilst measuring dexterity, are limited in their challenge.

It is therefore an object of the present invention to develop an apparatus for challenging human dexterity which alleviates the aforementioned problems in a simple and cost effective manner, together with a method of testing human dexterity by use of such apparatus.

According to the present invention there is now provided apparatus for supporting elongate sticks or rods which comprises a main body member having a base defining a base footprint of a first defined footprint area and which body member supporting and restraining a plurality of at least three arms extending therefrom in a direction away from the base, whereby each arm is inclined relative to a vertical axis extending through the body. In use, the apparatus is intended to support elongate sticks between the arm members and previously supported sticks balanced thereon. Primarily, this apparatus requires not only a steady hand for placing the elongate sticks in a balanced position but also of dexterity and creative

thinking ensuring that not only are the sticks balanced in this manner, but that the sticks mounted on the apparatus do not cause general disturbance or overbalancing of the apparatus itself. This provides a basic constructive apparatus for testing dexterity.

Preferably, the free ends of each arm, remote from the body, define an outer arm area therebetween, effectively defined by an imaginary perimeter extending between the free ends of adjacent arms, whereby this outer arm area is at least equal to, and preferably greater, than the footprint area. Usually, this outer arm area will be at least 30%, and preferably 50%, or greater than the footprint area. By providing such outer arm area to be greater than the footprint area increases the difficulty in balancing elongate stick members on such apparatus since not only is it necessary to carefully balance the sticks thereon but to ensure that such balancing of sticks does not cause a shift in the overall centre of gravity of the apparatus which could result in the apparatus overbalancing. The greater the distance that such elongate sticks are placed from vertical axis extending through the body, then the greater resulting moment will be created on the apparatus, effecting its overall stability.

It is further preferred that the footprint area and/or the outer arm areas are adjustable so as to vary the stability and hence difficulty of balancing such elongate sticks thereon. The footprint area can be increased to enhance stability and thus serves to reduce the difficulty of utilising the apparatus, whereby

minimising the footprint will increase difficulty. Likewise, increasing the outer arm area will further increase difficulty. The outer arm area can be adjusted by providing longer arms either by replacing existing arms with those which are longer, or by simply displacing existing arms further from the body. Alternatively, such outer arm areas can be increased by adjusting the angle of inclination of one or more such arms relative to the vertical axis.

Usually, the base will be formed by a plurality of at least three legs extending downwardly from the body in a direction away from the arms, and wherein each leg is inclined relative to the vertical axis extending through the body. Again, adjustment of the footprint area can be effected by varying the length of such legs or their angle of inclination relative to the vertical axis.

In one preferred embodiment of the present invention the, or at least the three, arms will extend completely through the body so that the legs are formed integrally with the arms as an extension thereof. For ease of storage, each arm may be adjustable into and out of the body to allow it to be easily constructed or taken down, whereby the arms will be physically restrained within the body, either by frictional engagement or by some other form of positive engagement between retaining members on the arms and said body.

Preferably, the arms will be straight and inclined at an angle of between 20° and 80° relative to the vertical axis. More usually, at an angle of between 30° and 70°.

It is also possible that at least two arms will be inclined at different angles relative to the vertical axis so as to provide a non-uniform or asymmetrical outer arm area disposed about the vertical axis. In addition, the footprint area may also be asymmetrically disposed about the vertical axis. Usually, each of the arms are disposed about the vertical axis so as to have a constant angle between each adjacent arm.

The body will preferably comprise a substantially solid member having a plurality of holes formed therein for receiving a body engaging end of each arm which is opposed to the remote ends previously mentioned. The plurality of holes may be greater than the number of arms, whereby such plurality of holes having varying angles of inclination relative to the vertical axis to allow the arms to be selectively mounted on the body at various angles of inclination relative to the vertical axis.

It is also usual that the base is removeably engaged with the body so as to allow the entire apparatus to be readily deconstructed for ease of storage.

Further according to the present invention there is also a provided a system for playing a game, which comprises the aforementioned apparatus together with a plurality of elongate sticks. Such plurality of elongate sticks may comprise a variety of sticks of different lengths, cross sectional shapes, weight, longitudinal profile and/or surface texture. By providing a variety of sticks, different

difficulties are presented in balancing such sticks on the apparatus providing a variety of different challenges to the users dexterity.

Still further according to the present invention there is also provided a method of testing human dexterity comprising setting up the aforementioned apparatus and subsequently selecting a plurality of elongate sticks and attempting to balance the plurality of sticks on and between the arms of the apparatus and any other sticks previously balanced between such arms without causing such sticks being balanced thereon or any sticks previously balanced thereon to be displaced from the apparatus. This method further necessitates that sticks are balanced on the apparatus so as to alleviate the apparatus from overbalancing.

Both the system for playing a game and the method of testing human dexterity utilising this apparatus provides consider advantages over prior art devices by providing the user with considerable scope for creativity in the choice of placement of the elongate sticks to be balanced on the apparatus, necessitating the user to carefully think about how sticks are linked and how they are balanced, often necessitating an understanding of levers, pivots and gravitational forces necessary to maintain stability of the apparatus. This creativity allows the user not only to carefully balance an elongate stick thereon, but also allows for forethought in making in difficult for other users to subsequently balance the sticks thereon.

This method may further comprise the step of selectively adjusting the size of one or both the base footprint area and/or the outer arm area of the apparatus.

It is also preferred the method includes the step of selectively adjusting the symmetry of one or both of the base footprint area and/or the outer arm area about the vertical axis of the apparatus.

Several preferred embodiments of the present invention will now be described, by way of example only, with reference to the accompanying illustrative drawings in which:

Figure 1 is a plan view from above of a first embodiment of the apparatus of the present invention; and

Figure 2 is vertical cross sectional view of the apparatus of Figure 1 along the lines II-II; and

Figure 3 is a plan view from above of the apparatus of Figure 1 schematically illustrating the relationship between arms and legs of the apparatus; and

Figure 4 is a perspective view from above and one side of a second embodiment of the apparatus according to the present invention; and

Figure 5 is a plan view from above of a third embodiment of the apparatus of the present invention; and

Figure 6 is a partial side sectional view of a fourth embodiment of apparatus according to the present invention.

Referring now to Figure 1, there is shown an apparatus (10) primarily designed for supporting elongate sticks (not shown) and which apparatus can form the basis of a system for testing human dexterity and for forming the basis of a recreational game. The apparatus (10) comprises a main body member (12) which, in this embodiment, comprises a solid plastic or rubber sphere with a series of preformed radially extending holes formed therein for receipt of a plurality of arms (14) and legs (16). Leg (16a) is disposed vertically below arm member (14a) and is hence shown in hashed lines in Figure 1 but is better viewed in Figure 2.

In this embodiment, the apparatus is provided with four arms which are disposed equidistant about a central vertical axis (A) (better seen in Figure 2) so that each arm extends radially outwardly from the central axis (A) so as to be disposed at 90° relative to each adjacent arm. Each of the arm members (14) are further inclined relative to the vertical axis (A) of the apparatus by a constant angle α (Figure 2) with this angle α being at least 20° and more preferably lying within the range of 30° to 70° relative to the vertical axis (A). Each of the elongate arm

members (14) have a first remote or free end (18) disposed so as to be remote from the body member (12) and opposed body engaging ends which are received within the apertures formed within the body (12). In this embodiment the arm members (14) have a substantially square or rectangular cross section.

Extending in an opposed direction to the arm members (14) are three leg members (16) which effectively form a base of the apparatus (10). Each of these leg members (16) extend substantially radially from the vertical axis (A) at a second angle β which angle β is again at least 20° and preferably lies within the range of 30° to 70°. Each of the three legs (16) are uniformly distributed about the central axis (A) so as to disposed at 120° relative to one another.

As with the arms (14), each of the legs (16) are substantially square or rectangular in cross section and are received within preformed apertures within the body (12). Both the arms and legs (14) may be received simply within a frictional fit engagement with the body to be retained therein or can be positively engaged with an appropriate snap engaging fitment commonly associated and used to maintain elongate members within plastic or rubber bodies. Alternatively locking pins could be employed to positively restrain the legs and arms within the body (12).

As can be clearly seen in the figures, the arm members (14) are considerably longer than the elongate leg members (16). Referring now to Figure 3, the ground

contact area or base footprint area defined by the legs (16) is shown as a hashed circle (24). This footprint is defined as the effective base contact area on which the apparatus rests. This may either be defined as a circle (24) encompassing the remote ends of each leg (16) or alternatively may be defined as a triangular area (26) formed by straight lines extending between the remote ends of adjacent legs (16). The remote ends (18) of each arm (14) then define an outer arm area (28) again which outer arm area is defined either as a concentric circle extending about axis (A) and extending between the remote ends (18) of each arm member (14) or may be alternatively defined by the area (in this case square area) (30) defined by extending straight lines between adjacent remote ends (18) of adjacent arm members (14). What is important in defining both the base area and the outer arm area of this type of apparatus is that the same definition is applied to both the footprint area and the outer arm area respectively ie. if the footprint area is defined as the circle on which each of the leg members lie then the outer arm area must also be defined as a circle on which each remote end (18) of each arm lies. If the footprint is defined as an area formed by straight lines extending between each remote end of adjacent legs then again the outer arm area must also be defined for that apparatus by the area encompassed by straight lines extending between the remote ends of each adjacent arms. It is also important to note that these footprint areas and outer arm areas are defined by such area when viewed in plan from above. Hence, in this embodiment, it is clearly seen that the footprint area (24) is considerably less than the outer arm area (28) (similarly footprint area (26) is

considerably less than outer arm area (30)). Preferably, the outer arm area will be greater than the footprint area by at least 30% and, more usually, by at least 50%.

It will be appreciated that the relative dimensions of the footprint areas (24 or 26) and the outer arm areas (28 or 30) are readily adjustable by varying the lengths or relative angles of inclination of the arms relative to the vertical axis (A) and similarly by varying the lengths for the relative angles of inclination of the legs (16) to the vertical axis (A). It will also be appreciated that the relative sizes of the footprint areas and associated outer arm areas significantly effect the stability of the apparatus (10). If the footprint area (24 or 26) exceeds the outer arm area then the apparatus will be extremely stable and very difficult to overbalance by the application of any load or weight to any of the arm members (14) whereby if the outer arm area is considerably greater (as shown in Figure 3) than the footprint area then the apparatus us considerably less stable and weight applied to the arm members (14) at a position axially remote from the footprint area (24) ie. so that it acts vertically downwards on the arm outside of the footprint area then it is likely to apply an overbalancing force (or moment) to the apparatus causing such apparatus to topple.

The main purpose of the apparatus constructed in accordance with this present invention is to provide a plurality of elongate arm members (18) which are disposed and inclined relative to a vertical axis upon which a plurality of elongate rod members or sticks (not shown) can be carefully balanced. Preferably, such

rods or sticks will be substantially square or rectangular in cross section and of a predetermined length sufficient to extend between at least two adjacent arm members so as to be carefully balanced thereon. Such rod members or sticks may be subsequently balanced between various different arm members or between arm members and previously balanced sticks or rods already balanced on such apparatus. Such sticks need not be balanced in a horizontal plane but could be inclined relative to the vertical axis. As more sticks are balanced on the apparatus the overall stability of the apparatus is subsequently effected whereby those sticks that are balanced such that their centre of gravity substantially lies on or close to the vertical axis (A) will not effect the overall balancing stability of the apparatus but where such sticks are balanced such that their centre of gravity acts outside of the footprint previously described then this will have an effect on the overall balancing stability of the apparatus. The addition of more sticks diametrically opposed about the vertical axis can then be utilised to counterbalance the effect of previously balanced sticks.

Overall this provides for a test of constructive skill and dexterity in balancing a plurality of sticks onto such apparatus requiring both a steady hand and an appreciation of balancing of the appropriate forces acting on such apparatus (10).

In one preferred use of this type of apparatus a plurality of users, or players, can easily be provided with a number of sticks and can take it in turns to balance such sticks on the apparatus until such time that a user in unable to successfully balance

a stick on the apparatus without dislodging one previously mounted stick member or causing the apparatus to overbalance. The objective such a test of skill or game would be to determine the first person to be able successfully balance all their sticks whereby any sticks dislodged during a users turn would be added to their pile and the game restarted until an appropriate winner is identified.

To further enhance this particular game, the overall system of a combined apparatus (10) and a plurality of sticks could be provided with a variety of sticks of different characteristics. For example, instead of the sticks being of uniform elongate lengths in a cross sectional area, the apparatus could be provided with an array of different sticks some of which may in fact be curved rather than perfectly straight, such sticks may also be of different lengths, of different weights and/or of different cross sectional profiles. For example, heavier sticks would significantly effect the overall stability of the apparatus when balanced thereon whereby longer sticks would require more careful balancing on the apparatus due to their increased lack of stability when compared to shorter sticks. Different cross sectional areas, such as a round cross sectional area, will also be more difficult to successfully balance the apparatus. Alternatively, if the texture of the sticks was varied such as to provide a roughened or abrasive texture then this will obviously increase any frictional engagement with the apparatus to make it more easily balanced on such apparatus. For the purposes of utilising the apparatus as a basis of a game, different characteristic sticks could be provided with different colours so as to be provided with different numerical scoring values so as to provide a

different objective of the game by balancing sticks of greater value, with associated greater difficulty, to increase the users score.

It will be appreciated that there are significant variations of the present invention which employ the basic inventive concept.

Referring now to Figure 4, an alternative construction of an apparatus (110) is illustrated. In this particular embodiment, the apparatus (110) is provided with a different type of body member (112) which is substantially a rectangular box. This box forms a combined body member and base whereby substantially square bottom end face (113) forms the base of the apparatus having a base footprint equivalent to the cross sectional area of such box. Here, each of the four arm members (114) are then simply inserted into the open top aperture of the box (112) so that a lower free end of each arm (114) engages with an inner side face of such box so as to allow the arms to be balanced as shown in Figure 4. The base (112) may be further enhanced by providing a series of internal projections under which the lower ends of each arm (114) can be abutted so as to retain such arms more firmly in the position shown in Figure 4 rather than simply relying on frictional engagement between the arm members and such box. However, the basic inventive concept between the embodiment shown in Figures 1 and 4 is maintained in that there is provided a base unit having a plurality of angularly inclined arm members (114) extending upwardly and outwardly therefrom upon which a plurality of sticks can be carefully balanced. Again, the apparatus (110)

will have a footprint area and an outer arm area similar to that described with reference to Figure 3.

Referring to Figure 5, there is shown a plan view from above of an alternative embodiment of the present invention (210) which is considered similar to that shown in Figure 4 whereby instead of a substantially rectangular box forming the base (112) there is provided a hexagonal (cross sectional) profiled box (112) forming the base from which six arm members (214) extend upwardly and outwardly in a similar manner to that shown in Figure 4 whereby each arm member (214) lies adjacent to one side wall of the base (212). Similarly, other shape boxes could be employed from triangular through to other polygonal cross sectional shapes having an associated number of arms equivalent to the number of side walls of such polygonal containers.

Referring to Figure 6, a yet further alternative embodiment of the present invention is disclosed which simply comprises three elongate straight rods (314) which are passed through a cylindrical container forming a base member (312). The lower ends of the rods (314) then form three leg members (316) as shown, whereby the base member (312) serves as a retaining collar maintaining the three rods (314) substantially inclined to a vertical axis of such apparatus (310). An appropriate plurality of sticks can then again be carefully balanced on the arms (314) extending outwardly and upwardly from the base (312) in a manner previously described. With regard to the embodiment shown in Figure 6 it will be

appreciated that a minimum of three elongate rods (314) are required to form such apparatus, but there is no limit on the upper number that can be utilised in this embodiment. The angle of inclination can be varied by using different depths of containers to form the body. Again, a base footprint will be defined similar to that with regard to the embodiment of Figure 3, whereby the three legs (316) define such base footprint area.

In addition, it will be appreciated that in this embodiment, the arms (314) and the legs (316) are integrally formed as a single elongate rod. It will be further appreciated that the embodiment shown in Figure 1 could be modified so as to simply have three arms and three legs whereby the arms and legs will be integrally formed from three single elongate rods which pass completely through the body member (12). A particular advantage of this type of design is that the footprint base area and the outer arm area are then readily adjusted in complimentary fashion by simply adjusting the relative lengths of the arms and the leg members extending upwardly and downwardly from the base member (12) accordingly. For example, for younger users of the apparatus or those with less experience or dexterity a more stable device could be created by increasing the footprint base area and reducing the outer arm area to increase stability of the apparatus. This could also be achieved with the apparatus shown in Figure 1 by simply inverting the apparatus such that the arm members (16) form the legs and the legs accordingly become the arms to provide a very stable apparatus for use by less skilled users in attempting to balance sticks thereon.

Additionally, whilst the preferred embodiments with reference to Figures 1 and 6 show basic symmetrical designs of the apparatus according to the present invention, it is to be appreciated that it is not an essential feature of the invention and that such apparatus could be asymmetrical about its vertical axis (A). Whilst a symmetrically formed footprint base provides greater stability for the apparatus, to increase the difficulty of use of the apparatus, the footprint could be positioned so as to be asymmetrical about the vertical axis (A). For example, with the embodiment shown in Figure 1 aligning the three legs so as to directly lay beneath three of the four arm members will necessitate careful construction and balancing of sticks on the arm members to prevent the apparatus overbalancing. Alternatively, the relative lengths and angles β of the leg members (16) of the embodiment shown in Figures 1 to 3 can be adjusted so as to asymmetrically form a footprint about the axis (A). Similarly, the outer arm area also need not be symmetrical about the vertical axis (A) but could be formed so as to be asymmetrical thereabouts. This would again involve careful positioning of the arms so as to adjust the overall position of the outer arm area, for example by simply removing one of the arms from the embodiment shown in Figures 1 to 5. Alternatively, one or other of such arm members of these embodiments could be made of a different length and/or inclined at a different angle α to the vertical axis. Alternatively, the arm members of the apparatus need not necessarily be straight but could be curved so as to achieve such an asymmetrical outer arm area disposed about the axis (A). Again, with reference to Figure 3, should one of the

arm members (A) be made half of the length of the other arm members this would significantly effect the outer arm area and also its asymmetrical position about axis (A) since an arm member of half the length of the associated arm member would result in the outer or remote end (18) of such arm member being disposed in a different horizontal plane with respect to the other remote ends (18) of adjacent arm members. It is important that the outer arm area is defined by the area when viewed directly from above. Similarly, instead of shortening one arm member it could in fact be elongated.

Additionally, whilst the preferred embodiments described herein have been made with reference to arm members having substantially a square or rectangular cross sectional area, different cross sectional areas of the arm could be employed to increase difficulty of the apparatus. For example, by making such cross sectional areas circular or triangular. In addition, alternative texture arm members could be employed to increase ease or difficulty of operation of the apparatus. A roughened surface would enhance frictional engagement with any sticks balanced thereon to reduce the difficulty of utilising this apparatus for balancing sticks, whereby a smoother surface would increase difficulty. Alternatively, different styles of arms could be employed for younger or less dextrous users which are provided with appropriate notches or projections to enable the sticks to more readily engaged and balanced thereon.

Whilst the embodiment shown in Figures 1 to 3 utilises a substantially spherical body member (12) this need not be spherical but could be any shape whatsoever providing appropriate restraint engagement for the arms and legs. Additionally, this body member (12) may be elongate so as to also form an appropriate base member to replace use of the legs (16) (in a manner similar to use of the box forming the base (112) in Figure 4. This base member (12) of Figure 1 may also be provided with a plurality of preformed holes to allow the arms to be positioned at different depths and/or angles relative to the vertical axis (A) so as to vary the difficulty of use of such apparatus.

In its simplest form, the apparatus (10) as shown in any of the embodiments herein described, can simply be made as a single integral one-piece unit whereby arms and legs are permanently and integrally secured to the base member.